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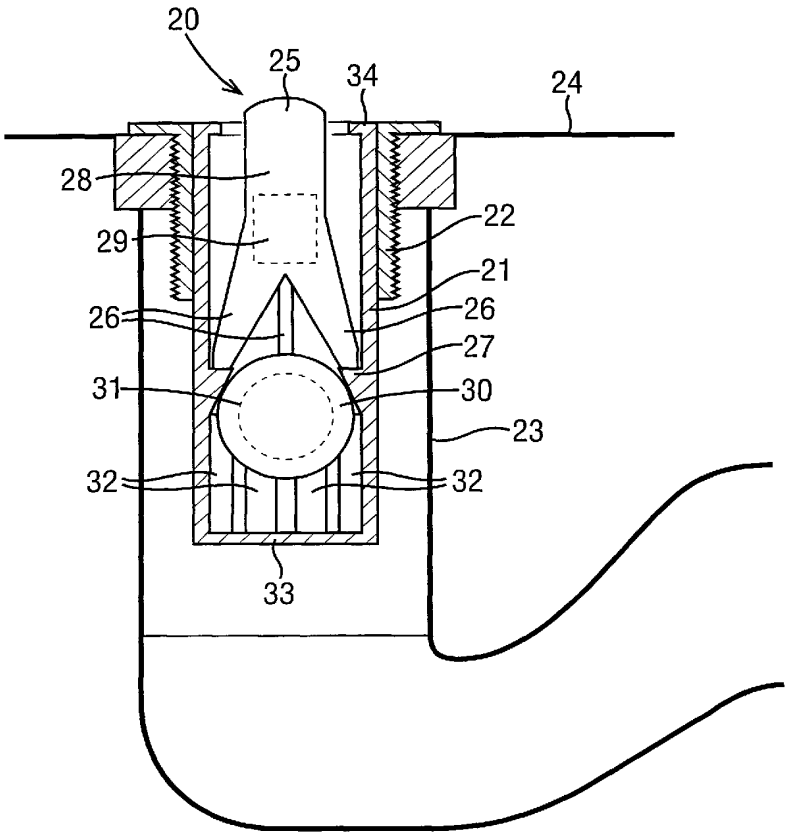
(54) Title: BATH OVERFLOW PREVENTOR



(57) Abstract: There is provided a device for regulating water depth in a domestic water receptacle wherein following fitment in, or over, the outflow rebate in such a receptacle, the device has: a closed configuration in which water is prevented by the device from leaving the receptacle; and a temporarily open configuration in which water may freely flow through the device and hence out of the receptacle; and wherein the device is arranged such that the presence of water above the device acts to force the device into the temporarily open configuration; and further wherein a magnetic force acts against the force of the water to hold the device in the closed configuration until a first predetermined depth of water is present above the device, at which point the device assumes the temporarily closed configuration; and further wherein the magnetic force also acts to return the device into the closed configuration whenever there is less than a second predetermined depth of water present above the device.

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Bath Overflow Preventor

This invention relates to a device for regulating water depth in domestic water receptacles, more particularly to a device for preventing water overflow in a bath whilst retaining a minimum level of water therein.

As is widely appreciated leaving a bath running whilst attending to other matters can all too easily lead to the bath over flowing, particularly as standard overflow pipes are incapable of dealing with the high flow rates found in modern plumbing. Overflowing baths are inconvenient and may lead to permanent damage to ceilings, furniture and fittings (eg due to damp or wood rot); or to accidents when pools of water develop on slippery floors or when water interferes with electrical supplies.

Certain devices have been proposed to prevent overfilling of baths and sinks, however many of these depend upon the use of floats attached to the plug capping the normal water exit rebate, and these can become entangled when the bath or sink is used, leading to premature emptying. These devices also have the disadvantage that, once activated they do not reset as the water level falls, so that the bath or sink is emptied completely. Other devices utilising springs or flexible pressure sensitive parts often lead to complete emptying once activated and often loose sensitivity to water levels with age. Devices based on springs may become less effective or fail completely due to corrosion or the build up of lime scale.

There is therefore a need for a device that reliably and consistently prevents overflow of water from baths and other domestic water receptacles.

There is therefore provided a device for regulating water depth in a domestic water receptacle wherein, following fitment in, or over, the outflow rebate in such a receptacle, the device has:

a closed configuration in which water is prevented by the device from leaving the receptacle;

a temporarily open configuration in which water may freely flow through the device and hence out of the receptacle;

and wherein the device is arranged such that the presence of water above the device acts to force the device into the temporarily open configuration;

and further wherein a magnetic force acts against the force of the water to hold the device in the closed configuration until a first predetermined depth of water is present above the device, at which point the device assumes the temporarily closed configuration;

and further wherein the magnetic force also acts to return the device into the closed configuration whenever there is less than a second predetermined depth of water present above the device.

Devices of the present invention are suitable for use in all domestic water receptacles including baths, hand basins and kitchen sinks having conventional outflow rebates. Devices of the present invention are particularly suitable for use in domestic baths and hand basins, most particularly in baths.

Devices of the present invention may be in the form of separate units to be used in pre-existing conventional domestic water receptacles or may be provided already installed in domestic water receptacles. The devices of the invention when provided already installed in domestic water receptacles may be removably or non-removably pre-installed.

The devices of the present invention re preferably made from, or are coated with, materials that will resist corrosion and/or the build up of deposits from water thereon.

The devices of the present invention are preferably of a size suitable to cover, or be fitted into, the outflow rebates of all domestic water receptacles. Preferred sizes range from 40 to 90 mm, for example 70 mm in diameter.

Magnetic materials for use in devices of the present invention must have sufficient strength to maintain the device in the closed configuration until a first predetermined depth of water is present above the device, and also to return the device from the temporarily open configuration to the closed configuration once the water depth above the device falls below a second predetermined depth. The first and second predetermined depths may be the same or different. The preferred first predetermined depth is from 25 to 50mm, more preferably from 30 to 40mm, for example 33mm. The preferred second predetermined depth is from 20 to 40mm, more preferably 25 to 35mm, for example 30mm.

Magnetic material for use in devices of the present invention must also be resistant to demagnetization in normal use and over long time periods.

Magnetic material having relatively high power to size ratios are preferred for use in devices of the present invention. Examples of preferred magnetic materials are Neodynium Iron Boron magnets and samarium Cobalt magnets. The magnetic materials used in devices of the present invention are preferably coated to prevent corrosion in use.

Preferred magnetic strengths for magnetic materials for use in devices of the present invention are Neodynium Iron Boron magnets of KJ/m^3 225, MGO 28 or KJ/m^3 265, MGO 33.

It will appreciated that a particular advantage of the devices of the present invention is that under almost any operating conditions they will either be entirely open or entirely closed. This feature results from the particular nature of magnetic attraction, i.e. as soon as two

magnetically attracted objects are forced apart it by a small distance the magnetic attraction between the objects is decreased and they therefore become easier to move apart. Similarly, any reductions in the force holding two magnetically attracted bodies apart will reduce the distance between the bodies and will therefore increase the attraction therebetween. In the case of the present invention, for a device starting in the closed position, as soon as water pressure above the device reaches a value even marginally greater than the magnetic attraction between two magnetically attracted parts within the device, these two parts will begin to move apart and the magnetic attraction between them will therefore decrease, making it even easier for them to move further apart, so that the device immediately moves into the temporarily open position. Conversely, for a device of the present invention starting in the temporarily open position, as soon as the water pressure above the device falls sufficiently to allow two magnetically attracted parts therein to begin to move together, the magnetic attraction between the parts will increase and the device will immediately move to the closed position.

There are many advantages provided by the above property in the devices of the present invention, for example it will become immediately apparent to a user as soon as the maximum water depth is achieved, because the device will clearly move to the temporarily open position.

Furthermore a disadvantage often found in, for example, bath overflow devices employing springs will be avoided in the devices of the present invention. This disadvantage of spring based overflow devices is due to the tendency of the devices to partially open as a maximum water level is approached and which often means that a balance is reached between the inflow of water to the receptacle and the outflow through the overflow device, leaving the overflow device in a permanently partially open position with water continually running

therethrough. This position may lead to fatigue in the spring and may also lead to the build up of corrosion or deposits in the device.

In a first embodiment of a device of the present invention there is provided a device comprising:

a) an outer casing suitable for forming a seal over, or in, the outflow rebate of a domestic water receptacle, having vents through which water is able to flow when the device is submerged in water, and

b) a sealing means having:

i) a closed position in which the vents in the outer casing are closed, so that water can not flow therethrough, and

ii) a temporarily open position, in which the vents in the outer casing are open, so that water is able to flow therethrough and into the outflow rebate of the domestic water receptacle when the device is fitted in, or over, such an outflow rebate;

and wherein the sealing means is arranged so that when the device is placed under water, water pressure acts on the sealing means to urge it from the closed position into the temporarily open position;

and further wherein a magnetic force acts to hold the sealing means in the closed position until the first predetermined depth of water is present above the device, at which point the sealing means moves to the temporarily open position;

and further wherein the magnetic force also acts to return the sealing means from the temporarily open position to the closed position as soon as there is less than the second predetermined depth of water present above the device.

Preferably, in the devices of the first embodiment of the present invention the outer casing is made of a plastic or non ferrous material having good temperature resistance in the ranges encountered in domestic situations, for example ABS plastic.

Devices of the first embodiment of the present invention preferably also comprise a connection apron for improving the seal formed between the device and the surfaces of the domestic water receptacles in which they are used. The connection apron is preferably composed of a non-porous material, for example TPE 50A shore rubber; and may be integral with the outer casing or may be attached thereto. In the latter case the connection apron may be fixed by adhesive to the outer casing. More preferably the connection apron is held in place elastically, for example by being formed with an inner diameter sufficiently less than the outer diameter of the outer casing to allow attachment thereto but to then provide grip thereto, thus providing a watertight seal. The connection apron is preferably able to feather out to make a wide and stable seal with the domestic water receptacle surface and prevents water seeping therebetween. The connection apron preferably rises up to at least half way up the side of the outer casing, so as to provide a good grip when the device is removed to allow emptying of the domestic water receptacle.

Devices of the first embodiment of the present invention may also be adapted to be removed from the waste water rebates of domestic water receptacles by being attached to standard bath or basin chains as for conventional plugs.

Preferably in devices of the first embodiment of the present invention, in the first position the sealing means physically abuts the outer casing to close the vents therein.

The magnetic force acting to retain the sealing means in the first position in devices of first embodiment of the present invention may be produced by incorporating magnetic material in the casing and by incorporating magnetically attractable corrosion resistant material in the

sealing means or vice versa or, optionally, both the outer casing and the sealing means may comprise magnetic material so long as the materials are arranged to attract each other.

Preferably in devices of the first embodiment of the present invention both the outer casing and the sealing means are circular so that the devices may be easily assembled.

In a preferred version of the devices of the first embodiment of the present invention, the magnetic force is produced by incorporating a magnet in the outer casing and by the sealing means comprising a magnetically attractable corrosion resistant material. In this version the sealing means preferably comprises a metallic plate, more preferably a stainless steel, or zinc coated steel, plate. In this version it is further preferred that the steel plate has affixed thereto a non-porous, non-metallic layer forming the contact layer between the sealing means and the outer casing. The two layers of the sealing means are preferably affixed by adhesive so that they will not separate or move relative to each other over the lifetime of the product. The non-porous layer may be made from sponge, latex, foam, neoprene, nitrile pvc or silicone rubber, or any other material suitable to prevent water escaping between the outer casing and the sealing means in its first position.

Preferably, in devices of the first embodiment of the present invention, the vents in the outer casing are arranged to allow a relatively rapid flow of water therethrough when the sealing means is in the second position. Preferably at least 500 mm^2 (more preferably at least 540 mm^2) of the outer casing comprises vents.

Preferably in devices of the first embodiment of the present invention the sealing means also comprises vents through which water may flow when the sealing means is in the second position, but through which water may not flow when the sealing means is in the first position. For example, the sealing means may comprise vents which are out of register with the vents of the outer casing, so that, when the sealing means abuts the outer casing, the vents

in the outer casing are closed by the non-vent areas of the sealing means and the vents of the sealing means are closed by the non-vent area of the outer casing. Preferably the total surface areas of the vent in the outer casing and the vents in the sealing means are selected so that water passes through the devices of the present invention at a sufficient rate to counter the water filling effect of generally available plumbing, but not so fast that the domestic water receptacle is emptied before the magnetic force acts to return the sealing means to the first position. Preferably the vents in the outer casing and the vents in the sealing means are arranged so that rotation of the sealing means when it is in the first position will not lead to unblocking of the vents in the outer casing.

In devices of the first embodiment of the present invention the sealing means and the outer casing are arranged so that, when the sealing means is in the second position, an open chamber is formed into which water flows before passing out of the device and into the outflow rebate of the domestic water receptacle in which the device is located. Water may flow out from this chamber through vents in the sealing means (if present) or additionally or alternatively by flowing around the sealing means. Preferably the chamber formed between the outer casing and the sealing means in the second position will have a volume of from 300 to 750mm^3, for example 450mm^3.

Preferably in devices of the first embodiment of the present invention the maximum distance between the outer casing and the sealing means when the sealing means is in the second position is from 0.3 to 2.5mm, more preferably from 1 to 1.5mm, for example 1.2mm.

In a further preferred version of the devices of the first embodiment of the present invention the outer casing has projections arranged on the inner face thereof to improve the seal between the outer casing and the sealing means in the first position. Preferred projections are in the form of ridges having a height of from 0.5 to 1mm. When the sealing means has an

upper layer of flexible non-porous material the projections will bite into this material to improve the seal and prevent leakage of water in the first position.

In a second embodiment of the devices of the present invention there is provided a device for permanent engagement in the outflow rebate of a domestic water receptacle comprising:

a first part for fixing a magnet or a metallic component in the entrance to the outflow rebate from the receptacle;

and a second part for positioning below the first part in the outflow rebate, the second part being in the form of a sphere and comprising a magnet or a metallic component complementary to the magnet or metallic component in the first part, such that magnetic attraction exists between the first and second parts;

the device being arrangable such that the second part will prevent water flowing down the outflow rebate until a first predetermined depth of water is present above the device, at which point the second part will be forced away from the first part thereby allowing water to flow down the outflow rebate until the depth of water above the device falls to a second predetermined depth; at which point the second part will return to the position in which it prevents further water flowing down the outflow rebate;

and wherein the first part may be manually displaced such that its distance from the second part is increased sufficiently to cause the second part to fall back into the position in which it does not block the outflow rebate, thereby allowing the passage of water therethrough.

Preferably in devices of the second embodiment of the present invention both the first part and the second part contain magnets.

Preferably in devices of the second embodiment of the present invention there is also provided a cage to prevent the second part being displaced more than a predetermined distance down the outflow rebate.

Preferably in devices of the second embodiment of the present invention the first part is not completely removable from the outflow rebate following the manual displacement carried out in order to allow the free flow of water through the device.

Preferably the devices of the second embodiment of the present invention are provided as a single unit.

In the devices of the second embodiment of the present invention the first part is preferably made of a plastic or non ferrous material having good temperature resistence in the ranges encountered in domestic situation, for example ABS plastic. The second part is also preferably made of a similar material as is the cage and/or the unit containing the first and second parts.

Preferably the devices of the second embodiment of the present invention are provided permanently fixed into a domestic water receptacle when the receptacle is purchased; however they may also be provided for fitment to pre-existing domestic water receptacles.

Specific embodiment of devices of the present invention will now be described by way of example with reference to the accompanying figures in which:

Figure 1 is view from above of a first embodiment of a device of the invention;

Figure 2 is view from below of the outer casing of the device shown in figure 1;

Figure 3 is view from above of plate for use in forming a sealing means for use in the device shown in figure 1;

Figure 4 is a view from the side of a sealing means for use in the device shown in figure 1;

Figure 5 is a sectional view of the device shown in figure 1, with the sealing means in the closed position;

Figure 6 is a sectional view of the device shown in figure 1, with the sealing means in the temporarily open position,

Figure 7 is a sectional view of a device of the first embodiment of the present invention pre-installed in a domestic bath;

Figure 8 is a sectional view of a device of the second embodiment of the present invention pre-installed in a domestic bath, the device being in the closed configuration;

Figure 9 is a sectional view of the device shown in figure 8, the device being in the temporarily open position; and

Figure 10 is a sectional view of the device shown in figure 8 with the first part of the device in the manually displaced position.

Referring to figure 1, the device 1 of the first embodiment of the present invention has an outer casing 2 having a diameter of 68mm and composed of ABS plastic.

The outer casing has vents 3 therein, through which water may flow if the vents are not obstructed. A button magnet 4 is present in a recess 5 in the outer casing. The magnet is a Neodynium Iron Boron magnet coated with nickel and having a magnet strength of KJ/m^3 225, MGO 28.

Referring to figure 2, the outer casing 2 has projections 6 on its inner face. The projections are spike shaped in section and extend by 1mm from the casing.

Figures 3 shows a plate 7 for use in the device shown in figure 1. The plate is constructed of zinc plated mild steel and has a diameter of 57mm. The plate has vents 8 therein. The vents 8 in the plate 7 are arranged so that when the plate is fixed inside the outer

casing 2 and in contact therewith, the vents 3 in the outer casing and the vents 8 in the plate do not coincide, forming a seal so that water may not flow through the vents 3 in the outer casing.

Figure 4 shows a sealing means 9 for use in the device shown in figure 1. The sealing means 9 comprises a plate 7 as shown in figure 3 and an upper plastic layer 10 comprising a mixture of polycarbonate and ABS plastics. The plate 9 and the upper layer 10 are joined together by solvent based acrylic adhesive. The upper layer 10 has vents (not shown) corresponding to the vents 8 in the metallic plate 7.

Figure 5 is a sectional view of the device shown in figure 1 along section A-A. In this figure the sealing means 9 is in the closed position, ie it is pressed against the outer casing of the device such that the vents 3 in the outer casing are sealed by the sealing means 9. The vents 8 in the sealing means 9 are sealed from access by water by the outer casing 2. When the device shown in figure 5 is placed on the base of a domestic bath 14 over the outflow rebate 15 thereof and water is run into the bath, a seal is formed between the device 1 and the bath surface 14. This seal is facilitated by the seal connection means 11 attached to the base of the outer casing. As the depth of water builds up above the device 1 the seal between the device and the bath surface improves and water flow out of the bath is blocked by the device. The build up of water exerts a downward pressure on the sealing means 9, but this is countered by the magnetic attraction between the magnet 4 (present in a recess 5 in the outer casing of the device) and the metal plate 7 of the sealing means.

Once the depth of the water above the device 1 exceeds approximately 33 mm the pressure acting on the sealing means 9 exceeds the attractive power of the magnet 4 and the sealing means moves away from the outer casing 2. Movement of the sealing means is arrested by contact with a ledge 12 formed by the seal connector 11. This position (the temporarily open position) is shown in figure 6.

Once the sealing means has moved to position 2 the vents 3 in the outer casing are unobstructed and water may flow into the chamber 13 created between the sealing means 9 and the outer casing 2. Water may then flow out of the chamber 13 by way of the vents 8 in the sealing means 9. The water then flows out of the bath by way of the outflow rebate 15.

The vents 3 in the outer casing 2 and the vents 8 in the sealing means 9 are of such a size that water will flow out of the bath at a rate greater than it can flow in from any conventional tap system, so that the water level in the bath will begin to fall as soon as the sealing means 9 to position 2.

Once the water level in the bath falls below a depth of approximately 25mm the water pressure exerted on the sealing means 9 will be insufficient to counter the attractive force extended by the magnet 4 on the metal plate 7, and the sealing means will move back into contact with the outer casing, as shown in figure 5 (the closed position). Water will no longer be able to enter the vents 3 in the outer casing 2 and outflow of water from the bath will cease, so that a minimum water level is retained in the bath.

It will be appreciated that if water continues to flow into the bath the water level will again exceed the maximum depth of 33mm and the sealing means will move to the temporarily open position, allowing water outflow and repeating the cycle. Water depth will therefore be maintained between the selected maximum and minimum levels, preventing either overflow of the bath or the complete emptying thereof.

A device of the first embodiment of the present invention pre-installed in a domestic bath is shown in figure 7. In this embodiment of the invention the outer casing 2 of the device 1 is inserted in a suitable recess 16 in the bath surface 14 surrounding the bath outflow rebate. Sealing between the device 1 and the bath surface 14 is provided by an O ring seal 17 which seals against the walls 18 of the recess 16.

It will be appreciated that different maximum and minimum water depths may be selected by the use of magnets 4 of various powers, or by preselecting the distance between the magnet and the metal plate in the first position or the second position.

By reference to figure 5 it may be appreciated that the projections 6 improve the seal between the outer casing 2 and the sealing means 9 by pressing into the upper layer of the sealing means 10 to improve the contact therebetween.

Referring to figure 8 a device 20 of the second embodiment of the present invention is shown in the closed position fitted in a domestic bath. The device comprises an outer container permanently fixed to a connecting sleeve 22 composed of chrome plated brass. The connecting sleeve 22 has been screwed into the outflow rebate 23 of a domestic bath so that it fits flush against the base 24 of the bath.

The outer container has a ledge 27 running around its entire circumference. Above this ledge 27 the outer container 21 has continuous walls. Below the ledge 27 the walls of the outer container 27 form a cage 33 due to the presence of vents 32 therein.

The device 20 further comprises a first part 25 that fits within the outer container and comprises three legs 26 that rest upon the ledge 27 that runs around the entire circumference of the outer container 21. The first part 25 also comprises a body portion 28 to which the legs 26 are attached and which may be grasped in order to raise the first part 25. The body 28 of the first part 25 contains a magnet 29. The magnet 29 is a Neodynium Iron Boron magnet having a magnetic strength of KJ/m^3 225, MGO 28. The first part is composed of ABS plastic

The first part 25 is constructed so as to allow water to flow at a high rate between it and the outer container 21 and thereafter (in the absence of any other obstruction) down the outflow rebate 23.

The device 20 also comprises a second part 30 which, in the closed position, rests against the underside of the ledge 27 forming a seal within the outer container 21 and therefore preventing water flowing into the outflow rebate 23. The second part is composed of ABS plastic and also contains a second magnet 31. This second magnet is a Neodynium Iron Boron magnet having a magnetic strength of KJ/m^3 225, MGO 28. The magnetic attraction between the first magnet 29 and the second magnet 31 holds the second part in the position shown in figure 8 when the first part 25 rests upon the ledge 27. If water is run into the bath when the device 20 is in the configuration shown in figure 8, water will flow partially into the device 20 through the gap between the body 28 of the first part 25 but will pass no further than the ledge 27. Water will therefore build up in the bath. This water will exert a pressure upon the second part 30 and, once the depth of the water exceeds a predetermined depth, for example 45 millimetres, the second part 30 will be displaced by the weight of water into the position show in figure 9.

Referring to figure 9, the device 20 is shown in the temporarily open position. In this configuration the weight of water has forced the second part 30 away from the first part 25 so that it rests upon the bottom of the cage 33 formed within the part of the outer container 21 below the ledge 27. Water therefore flows past the ledge 27, which is no longer sealed by the second part 30, and out of the vents 32, allowing the water level in the bath to fall. Once the water level in the bath is reduced below a second specified depth, for example 35 mm, the magnetic attraction between the magnet 29 within the first part 25 and the magnet 31 within the second part 30 causes the second part 30 the rise back up the outer container 21 and to reform a seal against the ledge 27, thereby preventing further outflow of water from the bath.

As shown in figure 10, the first part 25 may be raised within the outer container 21 and therefore, once the distance between the magnet 29 within the first part 25 and the magnet

31 within the second part 30 exceeds a certain distance, the second part 30 will fall down to rest at the base of the outer container 21. Any water already present within the bath or subsequently added thereto will then flow unimpeded between the gaps provided by the legs 26 of the first part 25 and out of the bath through the vents 32 in the cage 33 in the lower part of the outer container 21. The first part 25 is prevented from being completed removed from the outer container by the presence of a further ledge 34 running entirely around the outer circumference of the upper end of the outer container 21. Pushing the first part 25 back down until it rests upon ledge 27 will reduce the distance sufficiently between the magnet 29 within the first part 25 and the magnet 31 within the second part 30 so that the second part 30 will again be lifted up to form a seal against the ledge 27.

Claims:

1. A device for regulating water depth in a domestic water receptacle wherein following fitment in, or over, the outflow rebate in such a receptacle, the device has:

a closed configuration in which water is prevented by the device from leaving the receptacle; and

a temporarily open configuration in which water may freely flow through the device and hence out of the receptacle;

and wherein the device is arranged such that the presence of water above the device acts to force the device into the temporarily open configuration;

and further wherein a magnetic force acts against the force of the water to hold the device in the closed configuration until a first predetermined depth of water is present above the device, at which point the device assumes the temporarily closed configuration;

and further wherein the magnetic force also acts to return the device into the closed configuration whenever there is less than a second predetermined depth of water present above the device.

2. A device as claimed in claim 1 wherein the first specified water depth is from 25 to 50mm.

3. A device as claimed in claim 2 or claim 3 wherein the second specified water depth is from 20 to 40 mm.

4. A device as claimed in any proceeding claim wherein the magnetic force is provided by at least one magnet having a magnetic strength of KJ/m^3 225, MGO 28 to KJ/m^3 265, MGO 33.

5. A device as claimed in claim 4 where the at least one magnet is a Neodynium Iron Boron magnet, or a Samarium Colbalt magnet.

6. A device as claimed in any proceeding claim comprising:

a) an outer casing suitable for forming a seal over, or in, the outflow rebate of a domestic water receptacle, having vents through which water is able to flow when the device is submerged in water, and

b) a sealing means having:

i) a closed position in which the vents in the outer casing are closed, so that water can not flow therethrough, and

ii) a temporarily open position, in which the vents in the outer casing are open, so that water is able to flow therethrough and into the outflow rebate of the domestic water receptacle when the device is fitted in, or over, such an outflow rebate;

and wherein the sealing means is arranged so that when the device is placed under water, water pressure acts on the sealing means to urge it from the closed position into the temporarily open position;

and further wherein a magnetic force acts to hold the sealing means in the closed position until the first predetermined depth of water is present above the device, at which point the sealing means moves to the temporarily open position;

and further wherein the magnetic force also acts to return the sealing means from the temporarily open position to the closed position as soon as there is less than the second predetermined depth of water present above the device.

7. A device as claimed in claim 6 wherein in the closed position the sealing means physically abuts the outer casing to close the vents therein.

8. A device as claimed in claim 6 or claim 7 wherein the sealing means comprises a metallic plate and the magnetic force is provided by a magnet forming part of the outer casing.

9. A device as claimed in any of claims 6 to 8 wherein the sealing means further comprises a non porous, non metallic layer affixed to the metallic plate and forming the contact surface between the sealing means and the outer casing.

10. A device as claimed in any of claims 6 to 9 wherein, when the sealing means is in the temporarily open second position, an open chamber is formed between the outer casing and the sealing means.

11. A device as claimed in claim 10 wherein the volume of the chamber is from 300 to 750mm^3.

12. A device as claimed in any of claims 6 to 11 wherein the sealing means comprises vents through which water may flow when the sealing means is in the temporarily

open position but through which water may not flow when the sealing means is in the closed position.

13. A device as claimed in any of claims 6 to 12 wherein the outer casing has projections arranged on the inner face thereof to improve the seal between the outer casing and the sealing means in the closed position.

14. A device as claimed in any of claims 6 to 13 wherein the maximum distance between the outer casing and the sealing means when the sealing means is in the temporarily open position is from 0.3 to 2.5mm.

15. A device as claimed in any of claims 1 to 5 for permanent engagement in the outflow rebate of a domestic water receptacle comprising:

a first part for fixing a magnet or a metallic component in the entrance to the outflow rebate from the receptacle;

and a second part for positioning below the first part in the outflow rebate, the second part being in the form of a sphere and comprising a magnet or a metallic component complementary to the magnet or metallic component in the first part, such that magnetic attraction exists between the first and second parts;

the device being arrangable such that the second part will prevent water flowing down the outflow rebate until a first predetermined depth of water is present above the device, at which point the second part will be forced away from the first part thereby allowing water to flow down the outflow rebate until the depth of water above the device falls to a second

predetermined depth; at which point the second part will return to the position in which it prevents further water flowing down the outflow rebate;

and wherein the first part may be manually displaced such that its distance from the second part is increased sufficiently to cause the second part to fall back into the position in which it does not block the outflow rebate, thereby allowing the passage of water therethrough.

16. A device as claimed in claim 15 in which both the first part and the second part contain magnets.

17. A device as claimed in claim 15 or claim 6 which further comprises a cage to prevent the second part being displaced more than a predetermined distance down the outflow rebate.

18. A device as claimed in any of claims 15 to 17 wherein the first part is not completely removable from the outflow rebate following its manual displacement.

19. A device as herein described with reference to the description and the figures.

Fig. 1

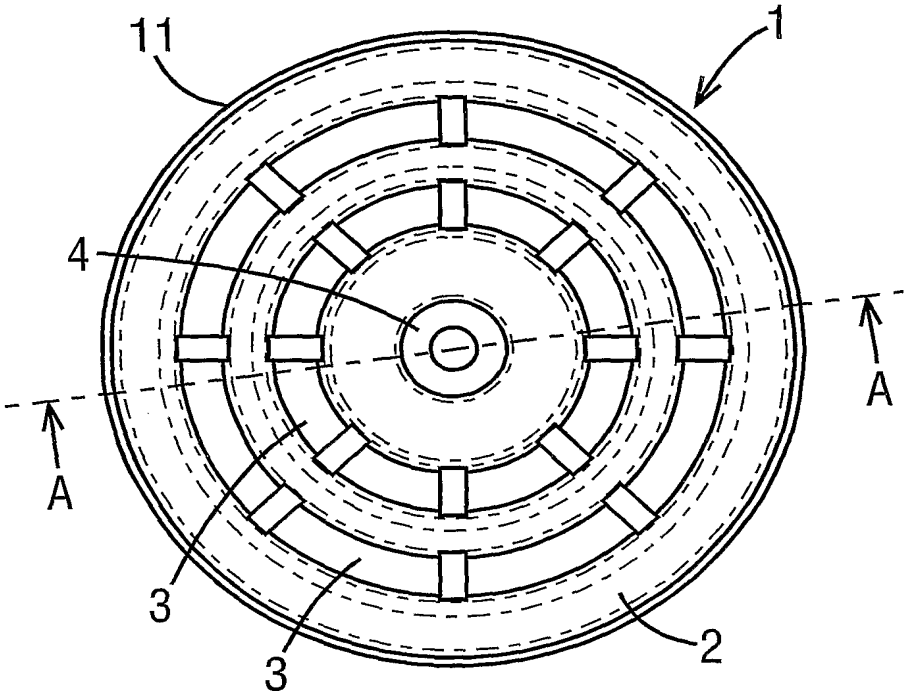


Fig. 2

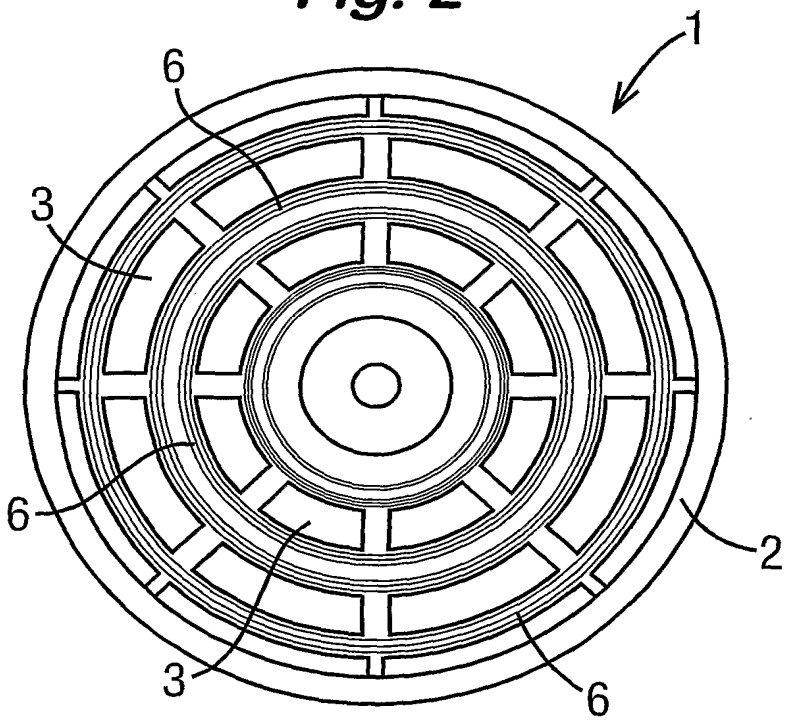


Fig. 3

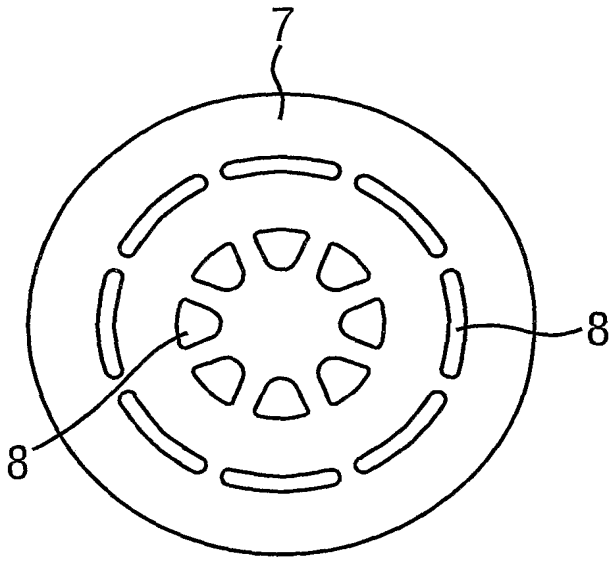


Fig. 4

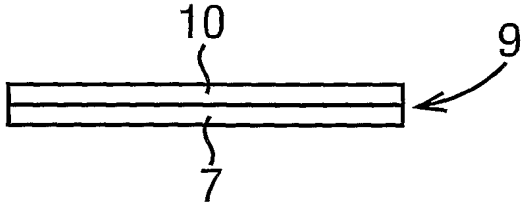


Fig. 7

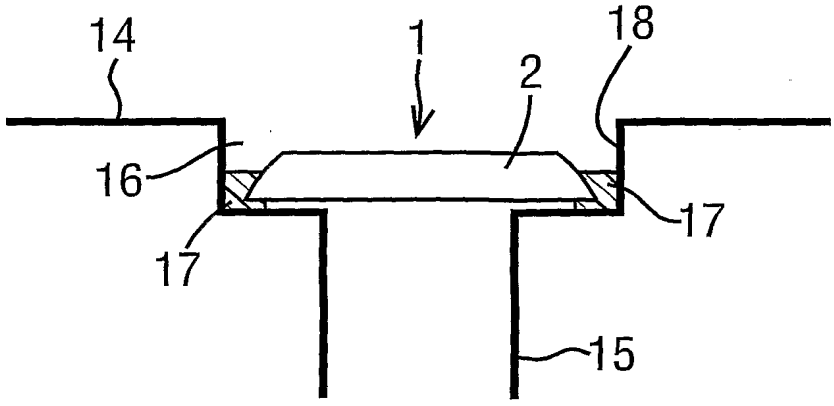


Fig. 5

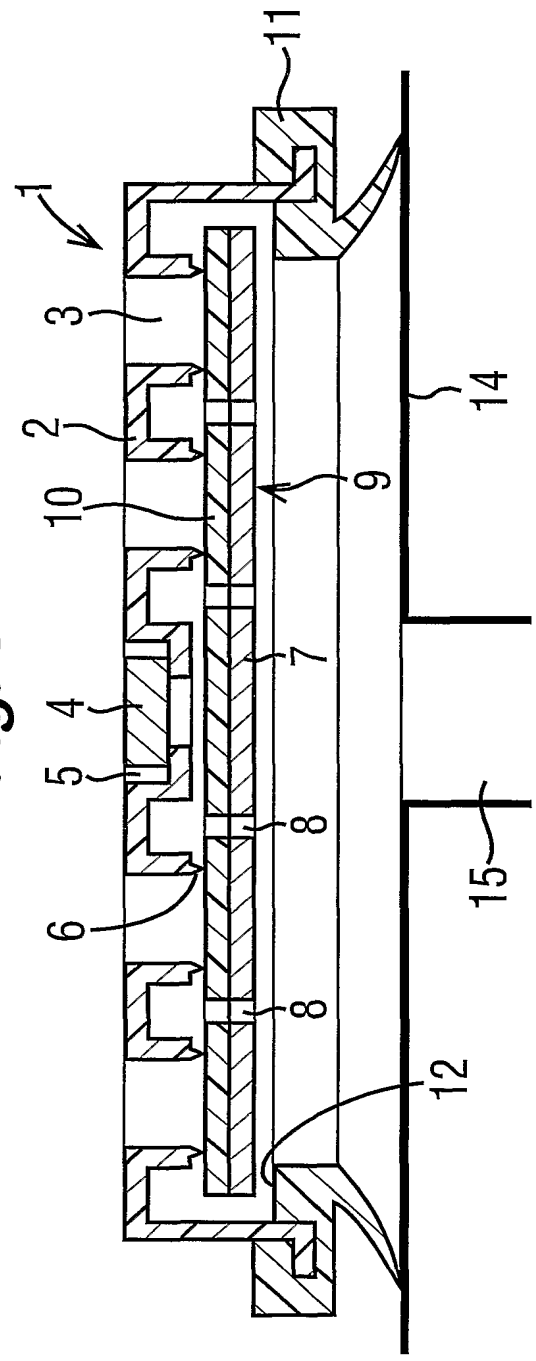


Fig. 6

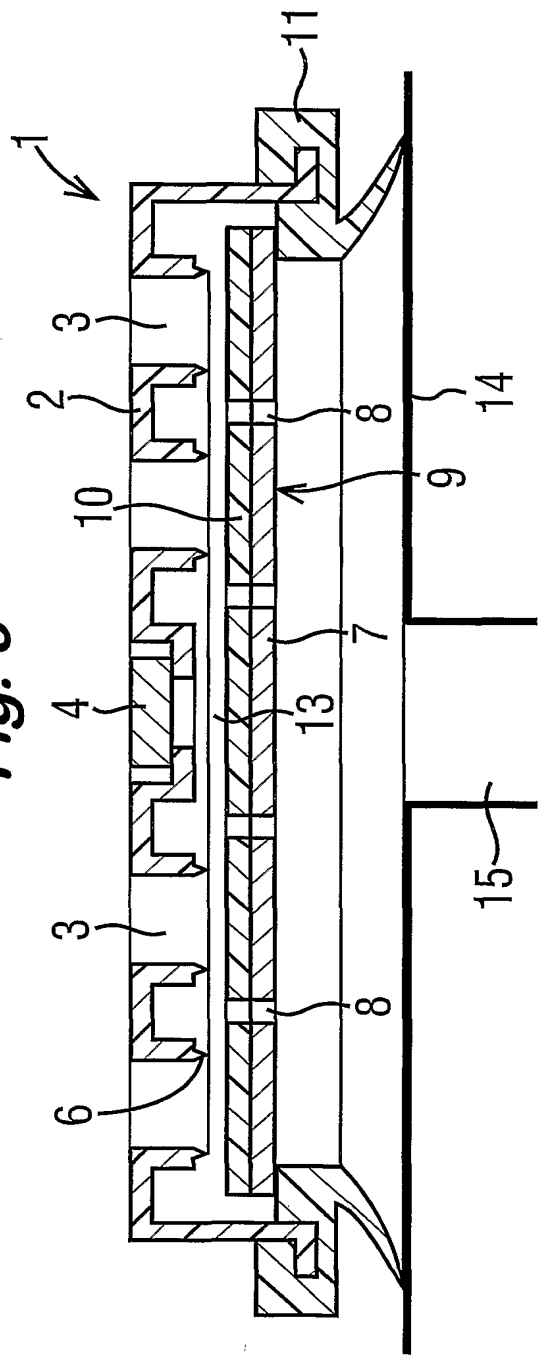


Fig. 8

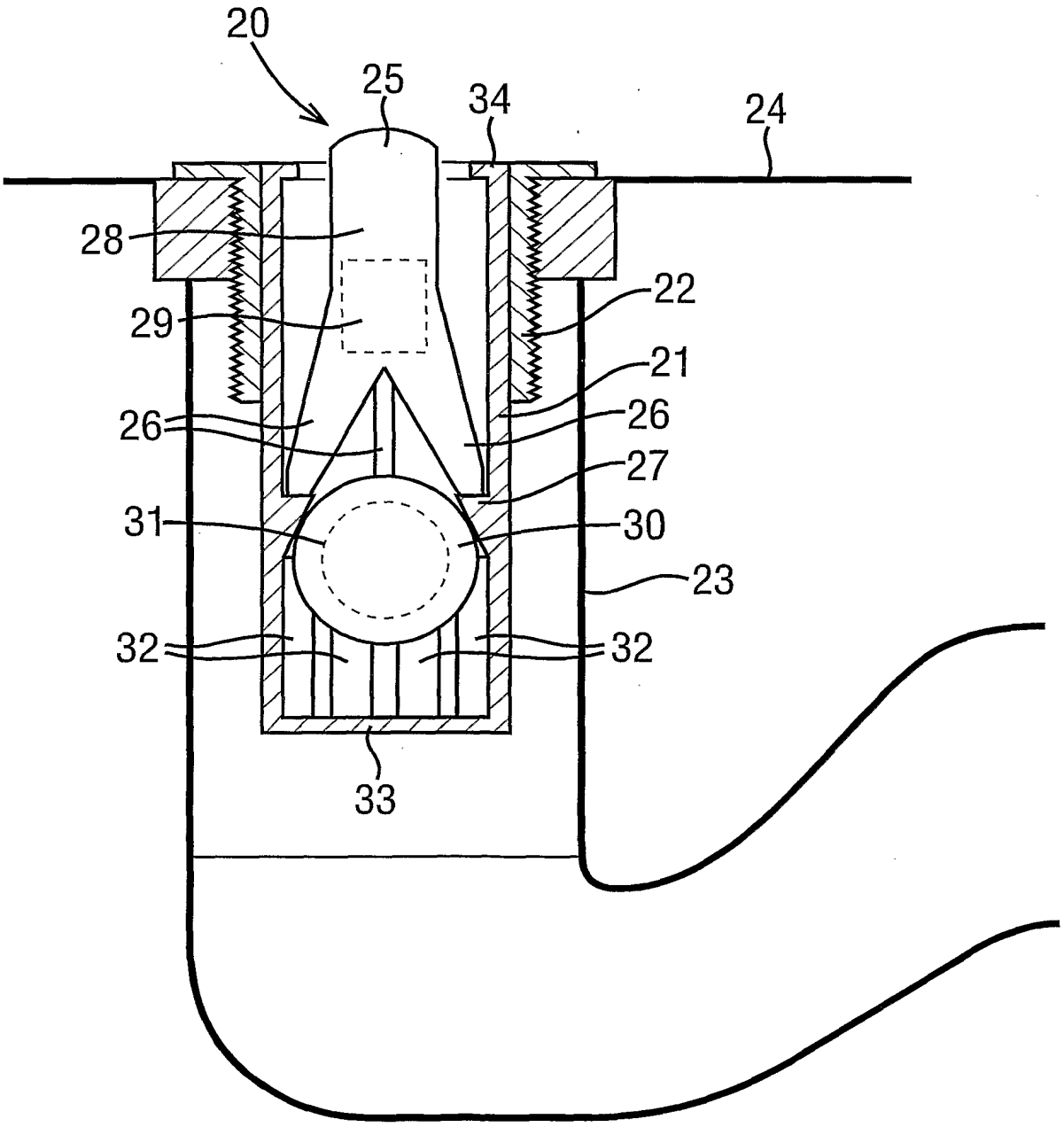


Fig. 9

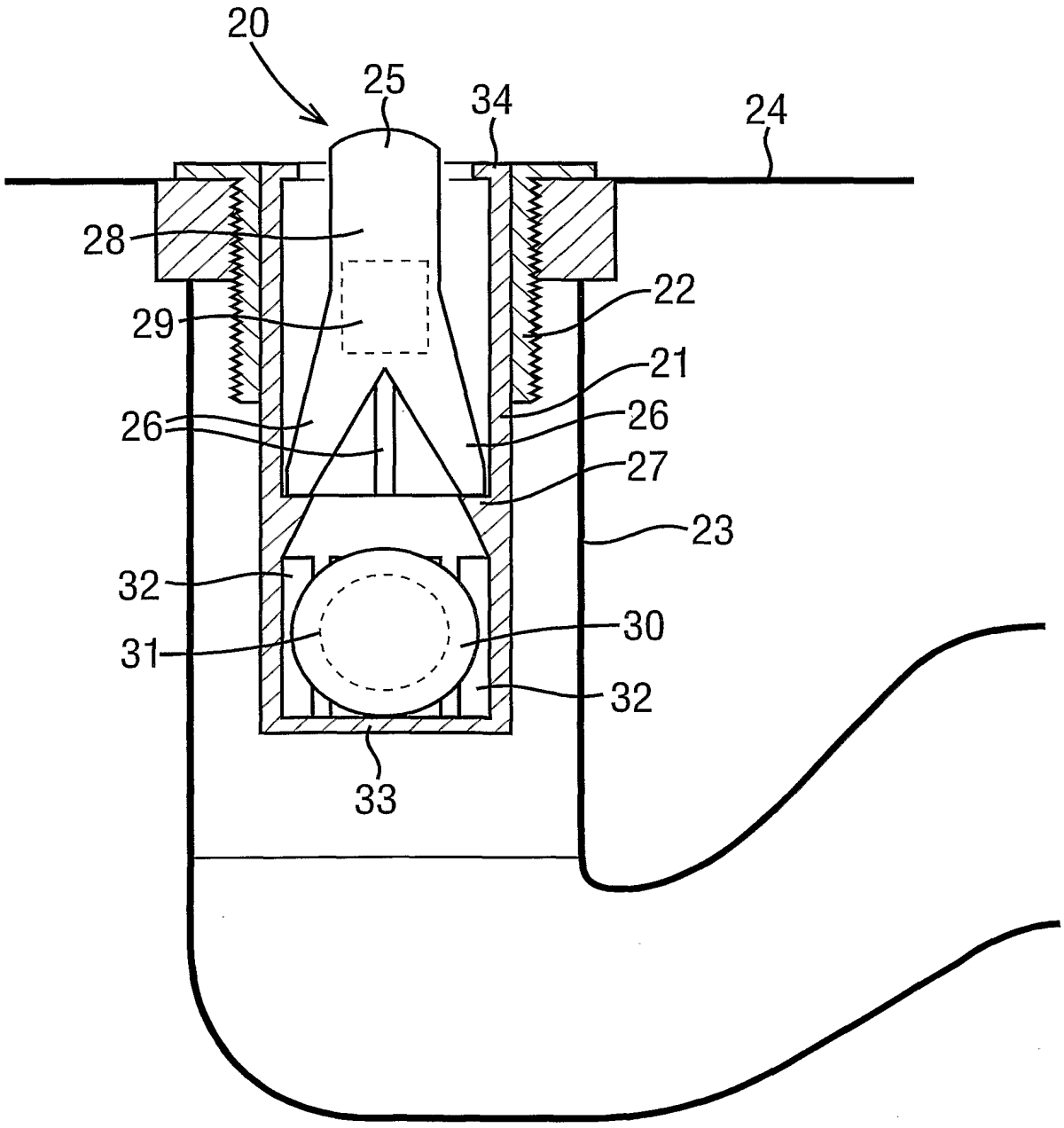
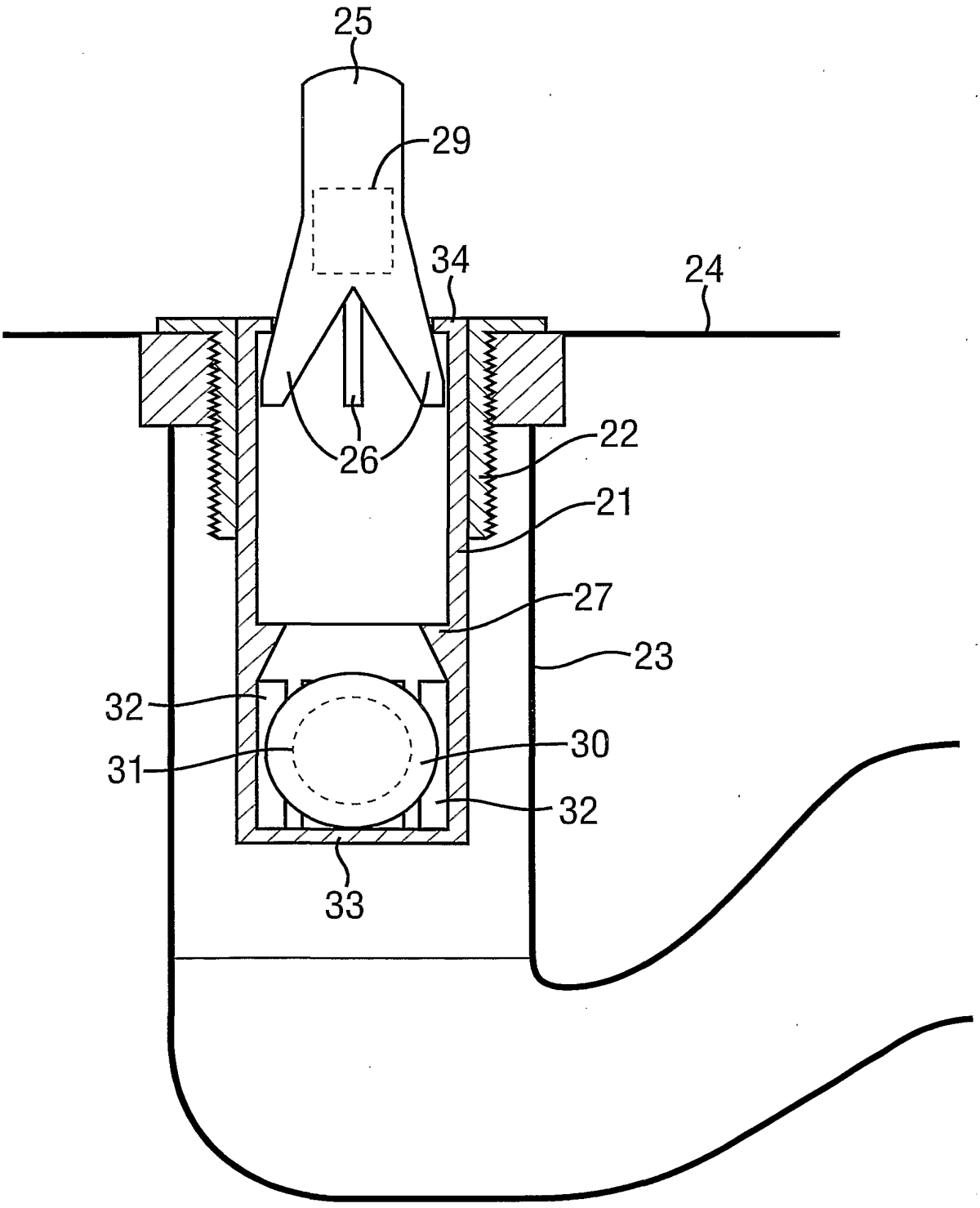


Fig. 10



INTERNATIONAL SEARCH REPORT

Int tional Application No
PCT/GB 01/03805

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E03C1/242

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E03C A47K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 26 00 355 A (KATTA HARTMUT) 21 July 1977 (1977-07-21) the whole document	1,6,7,12
A	DE 28 25 978 A (LANG GEORG) 21 February 1980 (1980-02-21) page 8, paragraph 2 -page 10, paragraph 2	1
A	DE 29 50 611 A (LANG GEORG ;GUTJAHR GERT DIPL PHYS DR (DE)) 19 June 1981 (1981-06-19) page 3 -page 4	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 November 2001	29/11/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Ellis, D

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INTERNATIONAL SEARCH REPORT

Information on patent family members

In ional Application No
PCT/GB 01/03805

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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DE 2825978 A	21-02-1980	DE 2825978 A1	21-02-1980
DE 2950611 A	19-06-1981	DE 2950611 A1	19-06-1981